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How Do Powerful CEOs Influence Corporate Environmental Performance?

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How Do Powerful CEOs Influence Corporate Environmental Performance?

Abstract

This study investigates how powerful chief executive officers (CEOs) affect their firm's environmental performance. Based on a sample of 5,222 U.S. firm-year observations, we find that such CEOs positively influence environmental performance and that this effect is more prevalent in profitable firms. This result suggests that powerful CEOs are influential in creating sufficient resources to enhance their firms' environmental performance. They are also typically well established and enjoy the quiet life that predisposes them to prioritize environmental projects. Our results also show that, although firms in polluted industries have lower environmental performance, they are able to mitigate this negative effect when they have powerful CEOs or are more profitable. Our results are robust to a variety of econometric models, alternative measures of environmental performance, and controlling for endogeneity issues.

Keywords: CEO power, environmental performance, profitability, polluted industries, slack resources.

1. Introduction

Firms are under increasing pressure to engage in green practices. They are therefore incorporating more and more environmental practices into their strategic planning process to prevent the environmental damage their operations could cause (Dowling and Pfeffer, 1975). This growing concern is confirmed by a significant increase in research on corporate environmental performance (EP; Jin et al., 2014; Francoeur et al., 2017). Firms differ, however, in their responses to pressure from the external environment and their involvement in environmental activities.

According to a recent survey by PwC,ⁱ 35% of chief executive officers (CEOs) in developed markets are increasing their investment in securing natural resources within the next three years, and managers are increasingly aware that sustainability issues must be rooted in business commitments. Several studies find that firms are becoming more sensitive to the demand for greater environmental sustainability and are more likely to engage in green practices (Waldman et al., 2006; Wu et al., 2014).

Papadakis and Barwise (2002) argue that the personal characteristics of top executives—and the CEO in particular—are likely to affect corporate decision making. Managerial power is particularly important for firm behavior (Pfeffer, 1981). According to Pfeffer (1981: 32), power is “the ability of one social actor to overcome resistance in achieving a desired objective or result.” Accordingly, CEOs who possess power are able to maintain substantial control over their firms in spite of opposition from other executives and board members (Baldenius et al., 2014). Because of the separation of ownership and control, managerial power becomes embedded in organizational structures, which allows CEOs to use their discretion to potentially divert firm resources for their own interests at the expense of external shareholders. Powerful CEOs can also possess sufficient clout to shirk corporate governance and market devices. Based on this agency perspective of CEO power, engaging in

environmental activities can be viewed as a tool to extract rents from shareholders and a way for opportunistic managers to cover up their poor performance (Berrone and Gomez-Mejia, 2009).

However, powerful CEOs can prefer to enjoy the quiet life rather than build an empire (Bertrand and Mullainathan, 2003). Because they are less vulnerable to job loss and career concerns, such CEOs respond faster and more effectively to external pressure for environmental practices (Walls and Berrone, 2017), even if those investments are not beneficial in the short run. Moreover, powerful CEOs who engage in environmental activities are likely to have a strong effect on their firms' ethical values; in this vein, Selznick (1957) suggests that CEOs are able to build a social structure of shared ethical values. According to the quiet life perspective, powerful CEOs are considered to be non-opportunistic agents who focus on doing the right thing, even if it does not increase their personal wealth (Francoeur et al., 2017).

Findings on the relation between CEO power and EP are not conclusive. For instance, Li et al. (2016) show that CEO power has a negative effect on environmental activities, which is supported by the agency theory perspective and the opportunistic behavior of powerful CEOs. In contrast, Walls and Berrone (2017) demonstrate a positive effect of formal and informal CEO power on corporate greening activities. This effect is particularly driven by shareholder activism and CEO experience in environmental practices. Jiraporn and Chintrakarn (2013) find that the relation between CEO power and corporate social responsibility (CSR), including EP, is nonlinear.

Our paper extends this literature by focusing not only on the effect of CEO power on EP, but also on how powerful CEOs influence EP. To do so, we use a sample of 5,222 observations of U.S. firms during the period 2007 to 2017. Our findings show that CEO power is positively associated with higher EP, which suggests that powerful CEOs contribute

significantly to the implementation of corporate environmental strategies. Moreover, our results show that the positive effect of CEO power on EP is more prevalent in profitable firms. This finding, in turn, suggests that firm performance is an important channel for powerful CEOs who seek to enhance their firms' EP and supports the perspective of slack resources. [We also find that, although firms in polluted industries have lower environmental performance, they are able to mitigate this negative effect when they have powerful CEOs or are more profitable.](#) Our findings are robust to several sensitivity checks.

This paper makes several contributions to the literature. First, it adds to the large body of research on the drivers of CSR ([Shen et al., 2016](#)) and, more specifically, on the determinants of EP related to CEO personal characteristics ([Arena et al., 2018](#)). This illustrates a beneficial effect of CEO power, whereby it is likely to enhance EP. Our interest in EP is driven by the rapid surge in global awareness of the need to protect the environment (by maintaining natural resources, addressing climate change, etc.). In response to the global challenge of climate change, for instance, [firms are becoming more conscious of broader environmental concerns and investing in green practices in response to stakeholder pressure and environmental policies](#) ([Banerjee and Gupta, 2019](#); [Guo et al., 2020](#)).

Second, this study complements previous literature by providing new evidence on how CEO power affects EP. To the best of our knowledge, this is the first study to investigate the channel through which CEO power affects EP. We draw on slack resources theory to examine how CEO power affects EP through financial performance. We document that powerful CEOs are influential in increasing firm performance, which leads them to boost their firms' resources to engage in environmental practices. [We also shed new light on the role of powerful CEOs in mitigating the negative effect of polluted industries on EP.](#)

Third, we extend previous work by focusing on CEO power concentration as a main determinant of corporate EP, rather than simply the relational influence CEOs have over

executives and directors (Walls and Berrone, 2017). We measure CEO power using a proxy developed by Bebchuk et al. (2011), the CEO pay slice (CPS), which is the ratio of CEO compensation to the aggregate compensation of the top five executives, including the CEO. According to Bebchuk et al., the CPS measures the CEO's ability to influence decision making despite potential opposition from other top executives and the board of directors. This measure better captures the control CEOs have over other executives and directors than other proxies, including CEO duality, tenure, and ownership (Mande and Son, 2012; Amzaleg et al., 2014).

The remainder of the paper is organized as follows. Section 2 reviews the literature and details the development of our hypotheses. Section 3 describes the sample data, variables, and methodology. Section 4 presents our empirical results and discussion. Section 5 concludes the paper.

2. Theoretical framework and hypotheses

According to agency theory, powerful CEOs are more likely to skirt controlling devices to pursue personal interests. In this case, power is used to serve self-interest rather than maximize firm value. In this study, we take a different perspective to unveil the incentives of powerful CEOs to engage in environmental actions.

2.1. Relation between CEO power and EP

The literature spans numerous hypotheses about the determinants of EP (Arena et al. 2018). We argue that CEO power influences corporate EP because powerful CEOs have a significant impact on corporate outcomes and decision making, including environmental actions.

Based on the quiet life hypothesis established by Bertrand and Mullainathan (2003), powerful CEOs can prefer to enjoy the quiet life rather empire building because they are

sufficiently insulated from the disciplinary effects of the stock market. In this sense, powerful CEOs are less likely to make difficult decisions such as large investments. Bertrand and Mullainathan document that powerful CEOs could be less likely to undertake risky investments that involve costly efforts. Consistent with this argument, Armstrong et al. (2012) suggest that firms with powerful CEOs are more transparent because they are shielded from the market's disciplinary effects of the adoption of antitakeover laws. Since powerful CEOs are invulnerable regarding career concerns, they are then less likely to face pressure to achieve immediate results. Because environmental investments have no clear financial benefits, powerful managers can choose to enjoy the quiet life by investing in environmental actions (Cespa and Cestone, 2007). These powerful CEOs will respond more readily and effectively to external pressure to engage in green actions to satisfy stakeholders' needs (Walls and Berrone, 2017).

Moreover, powerful CEOs are more likely to make responsible use of their power to engage in environmental investments, which can be beneficial in the long term for the firms they manage (Walls and Berrone, 2017). Powerful CEOs are deemed to possess high personal integrity, which leads them to include ethical values in their decision making. They are then less likely to engage in self-interested behaviors. Powerful CEOs are associated with better management practices. Haynes and Hillman (2010) argue for instance that CEO power can moderate the success of strategy implementation, especially if the CEO is powerful among the board of directors. Without powerful CEOs, directors are likely to engage in more debates and discussion that lead to more diverse viewpoints, which hampers the implementation of sound strategies. In addition, Adams et al. (2005) argue that powerful CEOs are better at implementing strategic decisions. Accordingly, CEOs are prone to do the right thing even if it does not increase their personal interests (Francoeur et al., 2017). From this perspective, Walls and Berrone (2017) find that both formal power and informal power seem to be good

catalysts for transforming shareholder activism into corporate greening. Additionally, Arena et al. (2018) provide evidence that CEO hubris, a common personality trait of powerful leaders, is positively related to environmental innovation.

The preceding arguments suggest that, instead of empire building, as supported by agency theory, powerful CEOs can prefer to enjoy the quiet life and can be in a good position to engage in sound environmental investments to satisfy stakeholders' interests. Our first hypothesis is formulated as follows.

H₁: Powerful CEOs positively influence corporate EP.

2.2. CEO power and EP: Exploring the role of financial performance

We further investigate how CEO power affects EP, focusing on firm financial performance as a channel that leads powerful CEOs to enhance EP. The effect of CEO power on firm performance has been extensively studied (Adams et al., 2005; Han et al., 2016). The agency view outlines that powerful CEOs can negatively affect firm value, because excessive power can provide CEOs with discretion to pursue rent extraction purposes (Adams et al., 2005). Bebchuk and Cohen (2005) report that rent extraction can lead to inefficient pay arrangements that destroy shareholder value. Similarly, Han et al. (2016) find that powerful CEOs are likely to negatively affect firm performance.

However, according to the managerial ability hypothesis, more talented CEOs enjoy more authority and higher compensation because they foster better firm performance than their counterparts (Graham and Jiaping, 2012). Similarly, Song and Wan (2019) argue that CEOs reach a high level of power due to their talents and skills. This suggests that the power of CEOs is attributable to their greater managerial skills rather than their rent-extracting abilities. Al-Najjar et al. (2016) also show that higher CPS levels indicate a CEO's talent and ability to foster stronger firm performance.

Powerful CEOs can enhance firm performance, which is likely to increase their engagement in environmental actions. Relying on slack resource theory, scholars argue that better financial performance can be viewed as a suitable predictor of CSR (Melo, 2012; Testa and D’Amato, 2017). Indeed, stronger financial performance creates slack resources, allowing firms to invest in social and environmental projects (Waddock and Graves, 1997). Testa and D’Amato (2017) argue that good corporate EP is potentially a consequence of prior strong financial performance, suggesting that firms choose to invest in “doing good by doing well” when they possess enough cash.

The preceding discussion leads to our second hypothesis.

H₂: More profitable firms with powerful CEOs have higher EP.

3. Research design

3.1. Sample and data

Our sample of U.S. firms was compiled from three different databases. The corporate EP data were collected from the MSCI-ESG database over the period 2007–2017. We computed the CPS from the Compustat ExecuComp database. We extracted the accounting data from the Compustat North America database. After matching the three databases, we removed firms that reported compensation for fewer than five executives (Bebchuk et al., 2011). Our final sample is an unbalanced panel dataset of 5,222 firm–year observations.

3.2. Variable measurements

EP: Our dependent variable is EP extracted from the MSCI-ESG database, which provides ratings on the environmental, social, and governance (ESG) pillars. The environmental pillar receives a score for each key issue, ranging from zero to 10, assessing firms’ involvement in environmental activities. The environmental rating includes strength and concern ratings about climate change, natural resources, pollution and waste, and environmental

opportunities. This environmental pillar also includes opportunities to invest in green activities and renewable energy. The environmental score then captures the engagement of firms in environmental activities. A higher score indicates a higher level of engagement in environmental and green activities and thus higher EP (Waddock and Graves, 1997).

CEO power: CEO power has attracted increasing attention in the executive compensation literature, which posits that, when CEOs possess power, they are more likely to negotiate their pay package. Accordingly, we measure CEO power by the CPS, that is, the fraction of the CEO's compensation of the aggregate compensation of the top five most highly paid executives, including the CEO (Bebchuk et al., 2011). Compensation includes salary, bonuses, other annual pay, the total value of restricted stock granted that year, the Black-Scholes value of stock options granted that year, long-term incentive payouts, and all other compensation (as reported in ExecuComp item TDC1). The CPS captures the ability of CEOs to influence decision making despite the potential opposition from top executives and the board of directors (Mande and Son, 2012). We test lagged CPS effect on EP. Lagged values of the CPS have been used in several studies to mitigate potential reverse causality issues (Bebchuk et al., 2011; Jiraporn et al. 2014; Correa and Lel, 2016).

Control variables: We also select a set of control variables that are known to affect EP, namely, firm performance, corporate governance quality, firm size, leverage, corporate dividends, capital expenditures, research and development (R&D) intensity, and cash flow. Firm performance is associated with EP, and this relation suggests that stronger firm performance can engender higher levels of EP (Waddock and Graves, 1997; Testa and D'Amato, 2017). We measure firm performance using Tobin's Q ratio and return on assets (ROA). We also control for corporate governance quality (GOV). This variable is a governance score extracted from the MSCI-ESG database. According to Jo and Harjoto (2012), CSR performance is positively associated with internal and external corporate

governance. We expect well-governed firms to be more likely to engage in environmental actions. Firm size is also associated with EP; since larger firms are under greater public and governmental scrutiny, they are more likely to invest in environmental activities (Jiraporn and Chintrakarn, 2013). We use the natural logarithm of total assets to measure firm size (*SIZE*). Following Francoeur et al. (2017), we control for firm leverage (*LEV*) as the ratio of total debt to total assets. We also introduce the dividend ratio (*DIV*) as the dividend payout divided by total assets (Jiraporn and Chintrakarn, 2013), capital expenditures (*CAPEX*) scaled by total assets, the firm's R&D intensity (*RD*) as total R&D scaled by total sales (Jo and Harjoto, 2012), and cash flow (*CF*) as income before extraordinary items plus depreciation and amortization. To control for possible variable effects across industries and time, we also include industry and year dummies.

3.3. Model specifications

We first use ordinary least squares (OLS) estimations to examine the effect powerful CEOs have on EP and we then focus on whether the relation between CEO power and EP varies with firm performance, using the following two equations, respectively:

$$EP_{it} = \alpha_0 + \beta.CPS(t-1)_{it} + \alpha_1ROA_{it} \text{ or } Tobin's Q + \alpha_2SIZE_{it} + \alpha_3LEV_{it} + \alpha_4GOV_{it} + \alpha_5DIV_{it} + \varepsilon_{it} \quad (1)$$

$$EP_{it} = \alpha_0 + \beta.CPS(t-1)_{it} + \alpha_1CPS(t-1)_{it} \times ROA_{it} \text{ or } TobinQ_{it} + \alpha_1ROA_{it} \text{ or } TobinQ + \alpha_2SIZE_{it} + \alpha_3LEV_{it} + \alpha_4GOV_{it} + \alpha_5DIV_{it} + \varepsilon_{it} \quad (2)$$

where

EP is the environmental pillar score from the MSCI-ESG database;

CPS is the fraction of the aggregate compensation of the top five executives, including the CEO (Bebchuk et al., 2011);

ROA is the return on assets, defined as net income divided by the book value of assets;

Tobin's Q is the market value of equity plus the book value of assets minus the book value of equity, all divided by the book value of assets;

SIZE is the natural logarithm of total assets;

LEV is the ratio of long-term debt to total assets;

GOV is the governance index from the MSCI-ESG database; and

DIV is the payout ratio, computed as the dividend payout divided by total assets.

4. Results and discussion

4.1. Univariate statistics and bivariate correlation

Table 1 reports descriptive statistics for the dependent and independent variables. The CPS variable has an average value of 39.9% for U.S. companies, which is comparable to the average reported by Bebchuk et al. (2011). The average firm has an environmental score of 4.654 on a scale from zero to 10, with a standard deviation of 2.005. This result means that U.S. companies are engaging in environmental issues. The average firm's return on assets is 5%, while Tobin's Q is, on average, 1.024%, with a median of 0.957%. The leverage ratio is 23%, on average, suggesting that U.S. companies are not highly indebted.

[Insert Table 1 Here]

Table 2 presents the correlation matrix. The CPS seems to be positively correlated with EP, which is in line with our first hypothesis. It is also significantly correlated with firm size, leverage, dividend, and profitability. The highest correlation is between both measures of firm performance, that is, the return on assets and Tobin's Q. We calculate the variance inflation factors (VIFs) to check for multicollinearity among the independent variables. All VIF values are below 1.47, indicating that our sample does not suffer from multicollinearity issues.

[Insert Table 2 Here]

4.2. Multivariate regression analyses

Table 3 reports the results on the relation between CEO power and EP using OLS estimations. We handle the reverse causality issue between CEO power and EP using a lead–

lag approach by including lagged CPS values as a measure of CEO power. The first column of Table 3 shows that the coefficient of the CPS variable is significantly positive at the 1% level. This result means that CEO power positively influences corporate environmental activities, supporting our first hypothesis, that powerful CEOs boost environmental activities. This finding is consistent with the idea that powerful CEOs have no career concerns and seek to enjoy the quiet life instead of empire building. This leads them to respond to stakeholder pressure, even though environmental investments do not personally benefit them. The positive relation between CEO power and EP also suggests that powerful CEOs respond faster and more effectively to pressure from their firms' stakeholders because of the high level of control they have over top executives and the board.

We now examine the nature of the relation between CEO power and EP and add the square of the CPS variable. The results in column (2) of Table 3 show that the coefficient of the quadratic term of the CPS (CPS squared) is associated with significantly lower EP. Thus, the relation between powerful CEOs and EP is non-monotonic. In particular, at lower levels of CEO power, the relation between the CPS and EP is positive. However, when CEOs wield excessive power, the association becomes negative, supporting the agency theory perspective only for high levels of CEO power.

To further shed light on this association, we apply the test for a U-shaped relation by Lind and Mehlum (2010). The results support that the association between the CPS and EP is non-monotonic. We calculate the inflection point where the impact of CEO power changes from positive to negative. The inflection point is 0.536. This finding remains consistent with the agency theory perspective. Hence, when CEOs possess excessive levels of power, they could have an exalted opinion of their abilities and are thus less likely to heed the advice of other executives. Excessively powerful CEOs then become less motivated to invest in corporate environmental activities, because the potential gains from adopting environmental

practices seem frivolous compared to other tools of expropriation (Jiraporn and Chintrakarn, 2013).

Our regressions also include the standard control variables used in the literature. Table 3 shows that firms with greater financial performance (*ROA*) are more likely to engage in corporate environmental activities. The results remain consistent with the slack resource hypothesis. The corporate governance score exhibits a positive and significant coefficient, suggesting that well-governed firms have stronger EP compared to firms that are weakly governed. Consistent with Jo and Harjoto (2012), a firm's CSR choice is positively related to internal and external corporate governance. Similarly, corporate dividends are associated with EP. However, firm leverage is negatively correlated with EP, indicating that firms that are highly leveraged are less likely to adopt environmentally friendly practices.

[Insert Table 3 Here]

Next, we focus on whether the effect of CEO power on EP varies between high and low levels of firm performance. We use two dummy variables, *ROA_dummy* and *Tobin's Q_dummy*, that equal one for profitable firms, and zero otherwise. The effect of both proxies of firm performance on EP is positive and significant at the 1% level. This finding suggests that profitable firms are likely to engage in environmental actions.

We also find that the coefficients on the interaction terms (*CPS*×*ROA* and *CPS*×*Tobin's Q*) are positively associated with EP. This finding suggests that the effect of CEO power on EP is more prevalent for profitable firms. This result is consistent with the slack resource hypothesis and with previous literature showing that EP is potentially a consequence of prior strong financial performance. Accordingly, Testa and D'Amato (2017) argue that firms choose to do good by doing well. Moreover, firms with stronger financial performance are more likely to hold slack resources (Waddock and Graves, 1997). These resources can motivate managers to invest in social and environmental activities. In addition,

our proxy for CEO power better captures top managerial talent and the concentration of decision making. Our finding is consistent with that of Al-Najjar et al. (2016), suggesting that powerful CEOs have a higher CPS because of their superior talent and skills, which leads the firms they manage to reach high levels of financial performance and to engage in environmental actions.

In conclusion, powerful CEOs enjoy a quieter life by investing in environmental activities. We argue that these CEOs possess superior talent and skills to enhance firm performance and generate the slack resources needed to invest in environmental activities, which, in turn, improves their firms' EP. Hence, powerful CEOs positively influence corporate EP in more profitable firms.

Taken together, our main findings in Tables 3 and 4 suggest that CEO power, on average, has a statistically significant influence on corporate EP, especially for high-performing companies. Hence, in more profitable firms, powerful CEOs are more likely to engage in green activities to enhance EP.

[Insert Table 4 Here]

We complement our analysis by examining whether CEO power enhances EP in polluted industries. Some industrial sectors are prone to environmental concerns (Cordeiro et al., 2015). We use an indicator variable, *Polluted_Industries*, to capture the highly polluted firms in our sample. Specifically, this variable takes the value of one if the firm belongs to a polluted industry, and zero otherwise. Based on ESG disclosure, pollution-intensive industries are those that have a strong impact on the environment, such as manufacturing industries, mining, and chemicals (first-digit Standard Industrial Classification codes 1, 2, and 4). In contrast, so-called clean industries are those that do not have a strong impact on the environment, such as banking and other service industries (Dupire and M'Zali, 2018).

Column (1) of Table 5 shows that the coefficient of *Polluted_Industries* is significantly negative at the 1% level, suggesting that firms belonging to polluted industries are less likely to achieve better EP. However, the coefficient of the interaction terms between polluted industries and CEO power ($CPS_{(t-1)} \times Polluted_Industries$) is positive and significant at the 1% level. This finding suggests that powerful CEOs are more likely to engage in green activities when their firm is operating in highly polluted industries. In column (2), we test the effect of polluted industries on EP for more profitable firms. We find that the interaction term between *Polluted_Industries* and profitable firms ($ROA \times Polluted_Industries$) is positively and significantly associated with EP, suggesting that firms operating in polluted industries enhance their EP when they are more profitable.

Overall, these findings suggest that, although firms in polluted industries usually have lower EP, they are able to mitigate this negative effect when they have powerful CEOs and are more profitable.

[Insert Table 5 Here]

4.3. Robustness checks

The endogeneity problem: To mitigate the endogeneity issue of CEO power, we use a two-stages least squares (2SLS) approach to estimate the empirical model. Following Bebchuk et al. (2011), we use the industry median-adjusted CPS as our instrument (Jiraporn and Chintrakarn, 2013; Jiraporn et al., 2014). We also include control variables that are known to influence CEO power, such as the firm's size, debt, dividend ratio, and corporate governance quality (Bebchuk et al., 2011; Al-Najjar et al., 2016). We further test the validity of our instrument by performing Sargan's (1958) overidentification test; because Sargan's statistics are not significant, the selected instrument is valid. Additionally, the *F-statistic* (*partial R*²) is 5621.810 (0.711), which suggests that the estimated coefficients are not biased due to weak instruments (Bound et al., 1995). Table 6 shows that the result regarding the effect of the CPS

on EP remains unchanged using 2SLS estimations. It also reports the same results using generalized method of moments (GMM) estimations to control for potential endogeneity.

[Insert Table 6 Here]

Actual CPS measure: We examine the effect of CEO power on EP using the actual CPS measure rather than the lagged measure, following Baldenius et al. (2014) and Jiraporn et al. (2014). Specifically, we re-estimate the regression model specified by Eqs. (1) and (2) by replacing the lagged CPS with the actual CPS. Table 7 shows that the estimated coefficients on the actual CPS have the predicted sign in column (1). The interaction term is also significantly positive at the 1% level in column (2). These findings are consistent with previous results using the lagged CPS.

[Insert Table 7 Here]

Alternative measure of EP: Our measure of EP is extracted from the MSCI-ESG database. We now use environmental scores collected from the Sustainalytics database as an alternative measure. This database (known as SiRi Pro™ before 2009) is a global leader in ESG research and analysis. The Sustainalytics scoring system uses continuous measures in eight research fields, assessing environmental issues using a framework consisting of both core and sector-specific indicators. For each indicator assigned to a company, Sustainalytics analysts assign raw scores between zero and 100 corresponding to a specific answer category. The raw scores are then weighted according to a proprietary weight matrix. Table 8 shows that the results remain qualitatively unchanged using this alternative measure of EP.

[Insert Table 8 Here]

Splitting the sample: As an alternative way to examine whether more profitable firms with powerful CEOs tend to achieve better EP, we split our sample into two subsamples, with high and low profitability, respectively. We assign firms to the high-performance group if the value of Tobin's Q is above the median of the full sample, and to the low-performance group if

Tobin's Q is below the median. The results in Table 9 give support for the positive effect of CEO power on EP among profitable firms.

[Insert Table 9 Here]

Alternative measure of CEO power: We use CEO duality as an alternative measure of CEO power. We test the effect of the CPS on EP for two subsamples: firms in which the CEO is also the chairperson of the board and firms without CEO duality. Table 10 shows that the effect of the CPS on EP is negative only for firms with CEO duality. This result supports the agency view of excessive CEO power.

[Insert Table 10 Here]

Heckman sample selection bias: To calculate the CPS, we remove all firms for which the compensation data for the top five executives, including the CEO, were not available. Hence, our results could suffer from selection bias. To address this concern, we perform a Heckman two-stage procedure using all the firms in our sample. We create a binary variable that equals one for firms included in the original sample (i.e., the data on the top five executives are available), and zero otherwise. We then calculate the inverse Mills ratio (λ) and include this variable in our model to control for the potential selection bias. The results reported in Table 11 show that the significant positive association between CEO power and EP remains unchanged.

[Insert Table 11 Here]

5. Conclusion

The purpose of this paper is to examine how CEO power influences corporate EP. Using a sample of 5,222 U.S. firm-years during the period from 2007 to 2017, the results show that powerful CEOs positively influence EP. We argue that powerful CEOs prefer to enjoy the quiet life and invest in environmental actions. This is the bright side of powerful

CEOs who can be influential and enhance environmental activities. However, when CEO power exceeds a threshold, EP decreases. This finding suggests that excessive levels of CEO power are associated with lower EP, supporting the agency theory perspective. Excessively powerful CEOs are then less likely to engage in environmental activities for expropriation purposes.

We also investigate how powerful CEOs use high levels of firm performance to invest in activities that promote EP. We document that the effect of CEO power on EP is more prevalent for profitable firms. We conclude that powerful CEOs possess the talents and skills to enhance firm performance and generate the necessary slack resources to invest in projects that improve EP.

Finally, we find that firms operating in polluted industries have lower EP. However, these firms are able to mitigate this negative effect when they have powerful CEOs or are more profitable. The results are robust to a variety of econometric models, to an alternative measure of EP, and to controlling for potential endogeneity.

These findings help policymakers in implementing regulations to constrain companies to respond to stakeholder pressures to engage in environmental activities that will have a favorable impact on the overall economy. These findings also help managers focus on increasing firm performance, because the slack resources generated help them easily fund environmental activities and contribute to a cleaner economy. Our findings are also important for academicians, because they shed new light on the bright side of CEO power. Powerful CEOs can be influential in creating value and engaging more in environmental activities. However, excessive power can harm environmental actions and destroy shareholder value, with negative consequences on the stability of financial markets.

Based on these conclusions, an interesting avenue for future research could be to examine the effect of different levels of CEO power on firm productivity.

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Table 1. Summary statistics

This table displays summary statistics for the period 2007–2017 for a sample of U.S. firms. The variable *EP* refers to the environmental pillar score from the MSCI-ESG database; *CPS* is the CEO power measure, computed as the fraction of the aggregate compensation of the top five executives, including the CEO (Bebchuk et al., 2011); *Tobin's Q* is computed as the market value of equity plus the book value of assets minus the book value of equity, all divided by the book value of assets; *ROA* is the return on assets, defined as net income divided by the book value of assets; *GOV* is the governance index from the MSCI-ESG database; *SIZE* is the natural logarithm of total assets; *DIV* is the dividend ratio, computed as dividends paid divided by total assets; and *LEV* is the ratio of long-term debt to total assets.

Variables	Mean	Std. Dev.	1st	25th	Median	75th	99th
EP	4.654	2.005	0.700	3.200	4.500	6.000	10.000
CPS_(t-1)	0.399	0.127	0.020	0.344	0.415	0.471	0.698
Tobin's Q	1.024	0.746	-0.191	0.525	0.957	1.421	3.461
ROA	0.051	0.088	-0.153	0.024	0.054	0.090	0.241
GOV	6.131	2.620	0.900	4.000	6.000	8.500	10.000
SIZE	8.183	1.501	5.245	7.086	8.140	9.179	11.635
DIV	0.018	0.027	0.000	0.000	0.010	0.025	0.115
LEV	0.230	0.182	0.000	0.089	0.217	0.331	0.643

Table 2. Bivariate correlation matrix

This table presents the Spearman and Pearson (below and above the diagonal, respectively) correlation matrix between the variables used in the regressions. The variable *EP* refers to the environmental pillar score from the MSCI-ESG database; *CPS* is the CEO power measure, computed as the fraction of the aggregate compensation of the top five executives, including the CEO (Bebchuk et al., 2011); *ROA* is the return on assets, defined as net income divided by the book value of assets; *Tobin's Q* is computed as the market value of equity plus the book value of assets minus the book value of equity, all divided by the book value of assets; *GOV* is the governance index from the MSCI-ESG database; *SIZE* is the natural logarithm of total assets; *DIV* is the dividend ratio, computed as dividends paid divided by total assets; and *LEV* is the ratio of long-term debt to total assets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	EP	CPS_(t-1)	ROA	Tobin's Q	GOV	SIZE	DIV	LEV	VIF
EP	1	0.040***	0.100***	0.086***	-0.007	0.189***	0.038***	0.048***	Mean VIF: 1.29
CPS_(t-1)	0.040***	1	0.024**	-0.046***	0.008	0.077***	0.032**	0.064***	1.02
ROA	0.104***	0.023**	1	0.4270***	0.086***	0.019*	0.340***	-0.138***	1.47
Tobin's Q	0.092***	-0.046***	0.418***	1	0.027*	-0.227***	0.333***	-0.046***	1.46
GOV	-0.003	0.008	0.076***	0.023*	1	0.045**	0.023	-0.059***	1.02
SIZE	0.185***	0.077***	0.021*	-0.224***	0.067***	1	0.071***	0.167***	1.22
DIV	0.037***	0.032**	0.319***	0.311***	0.015	0.054***	1	0.048***	1.20
LEV	0.056***	0.064***	-0.132***	-0.052***	-0.045***	0.193***	0.033***	1	1.46

Table 3. Effect of CEO power on EP

This table presents the results of regressions on the effect of CEO power on EP. The variable *EP* refers to the environmental pillar score from the MSCI-ESG database; *CPS* is the CEO power measure, computed as the fraction of the aggregate compensation of the top five executives, including the CEO (Bebchuk et al., 2011); *Tobin's Q* is computed as the market value of equity plus the book value of assets minus the book value of equity, all divided by the book value of assets; *SIZE* is the natural logarithm of total assets; *LEV* is the ratio of long-term debt to total assets; *GOV* is the governance index from the MSCI-ESG database; and *DIV* is the dividend ratio, computed as dividends paid divided by total assets. Robust standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	(1) EP	(2) EP
CPS_(t-1)	0.569*** (0.177)	1.642*** (0.574)
CPS_(t-1)²		-1.530** (0.795)
Tobin's Q	0.285*** (0.037)	0.304*** (0.033)
SIZE	0.410*** (0.017)	0.403*** (0.015)
LEV	-0.975*** (0.162)	-0.972*** (0.147)
GOV	0.009 (0.009)	0.010 (0.008)
DIV	3.112*** (0.914)	2.513*** (0.808)
Constant	0.983*** (0.189)	0.862*** (0.189)
<i>Observations</i>	5,225	5,225
<i>R-Squared</i>	0.381	0.375
<i>Year fixed effects</i>	yes	yes
<i>Industry fixed effects</i>	yes	yes

Table 4. Effect of CEO power on EP: The moderating effect of firm performance

This table presents the estimation results of the effect of the CPS on EP for profitable firms. The variable *EP* refers to the environmental pillar score from the MSCI-ESG database; *CPS* is the CEO power measure, computed as the fraction of the aggregate compensation of the top five executives, including the CEO (Bebchuk et al., 2011); *Tobin's Q_dummy* is a dummy variable that equals one if *Tobin's Q* is greater than the median; *ROA_dummy* is a dummy variable that equals one if *ROA* is greater than the median; *SIZE* is the natural logarithm of total assets; *LEV* is the ratio of long-term debt to total assets; *GOV* is the governance index from the MSCI-ESG database; and *DIV* is the dividend ratio, computed as dividends paid divided by total assets; and. Robust standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	(1) EP	(2) EP
CPS_(t-1)	0.296 (0.222)	0.243 (0.227)
CPS_(t-1)*ROA_Dummy	0.417*** (0.150)	
CPS_(t-1)*Tobin's Q_Dummy		0.593*** (0.169)
ROA_Dummy	1.068*** (0.329)	
Tobin's Q_Dummy		0.359*** (0.069)
SIZE	0.375*** (0.020)	0.393*** (0.020)
LEV	-0.304* (0.168)	-0.608*** (0.168)
GOV	-0.011 (0.011)	-0.012 (0.011)
DIV	0.525 (1.049)	-0.237 (1.026)
Constant	-0.380 (0.363)	-0.549 (0.367)
<i>Observations</i>	5,225	5,225
<i>R-Squared</i>	0.346	0.357
<i>Year fixed effects</i>	Yes	Yes
<i>Industry fixed effects</i>	Yes	Yes

Table 5. CPS effect on EP in polluted industries

This table presents the estimation results of the effect of the CPS on EP for firms in polluted industries. The variable *EP* refers to the environmental pillar score from the MSCI-ESG database; *CPS* is the CEO power measure, computed as the fraction of the aggregate compensation of the top five executives, including the CEO (Bebchuk et al., 2011); *Polluted_Industries* is a dummy variable that equals one if the firm belongs to a polluted industry; *ROA* is the return on assets, defined as net income divided by the book value of assets; *SIZE* is the natural logarithm of total assets; *LEV* is the ratio of long-term debt to total assets; *GOV* is the governance index from the MSCI-ESG database; and *DIV* is the dividend ratio, computed as dividends paid divided by total assets. Robust standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	1 EP	2 EP
CPS_(t-1)	0.001 (0.239)	
Polluted_Industries	-1.318*** (0.201)	-0.877*** (0.056)
CPS_(t-1)*Polluted_Industries	1.552*** (0.477)	
ROA	2.086*** (0.313)	1.004*** (0.377)
ROA*Polluted_Industries		2.568*** (0.497)
SIZE	0.341*** (0.020)	0.315*** (0.018)
LEV	-0.012 (0.168)	0.061 (0.149)
GOV	-0.013 (0.012)	-0.011 (0.010)
DIV	0.849 (1.078)	1.490 (0.932)
Constant	1.702*** (0.219)	2.003*** (0.172)
<i>Observations</i>	5,225	6,930
<i>R-Squared</i>	0.283	0.299
<i>Year fixed effects</i>	Yes	Yes
<i>Industry fixed effects</i>	No	No

Table 6. Endogeneity concerns

This table displays the 2SLS and GMM estimation results for our corporate EP models. The variable *EP* refers to the environmental pillar score from the MSCI-ESG database; *CPS* is our CEO power measure, computed as the fraction of the aggregate compensation of the top five executives, including the CEO (Bebchuk et al., 2011); *CPS_Adjusted* is the industry mean-adjusted CPS measure; *CPS_(t-1)instrumented* are the fitted values estimated from the first-stage regression; *Tobin's Q* is the market value of equity plus the book value of assets minus the book value of equity, all divided by the book value of assets; *SIZE* is the natural logarithm of total assets; *LEV* is the ratio of long-term debt to total assets; *GOV* is the governance index from the MSCI-ESG database; and *DIV* is the dividend ratio, computed as dividends paid divided by total assets. All financial variables are winsorized at the first and 99th percentiles. Robust and bootstrap standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
Variables	<i>First stage</i>	2SLS <i>Second stage</i>	GMM
CPS_(t-1) instrumented		0.513*** (0.188)	0.540*** (0.186)
Tobin's Q	0.004*** (0.001)	0.275*** (0.037)	0.287*** (0.037)
SIZE	0.004*** (0.000)	0.447*** (0.018)	0.412*** (0.017)
LEV	0.014*** (0.005)	-1.142*** (0.165)	-0.980*** (0.162)
GOV	0.000 (0.000)	0.022** (0.010)	0.008 (0.009)
DIV	-0.077*** (0.030)	2.790*** (0.914)	3.144*** (0.911)
CPS_Adjusted	0.983*** (0.005)		
Constant	0.364*** (0.006)	0.342 (0.222)	0.983*** (0.190)
Observations	5,225	5,225	5,225
R-Squared	0.890	0.389	0.370
Year dummies	yes	yes	yes
Industry dummies	yes	yes	yes
χ^2 (<i>p</i> -value)			
<i>Sargan statistic</i> (<i>p</i> -value)	0.421		
<i>F-Statistic</i>	982.49		

Table 7. Regressions using the actual CPS measure

This table displays the estimation results for the relation between CEO power and EP. The variable *EP* refers to the environmental pillar score from the MSCI-ESG database; *CPS_Actual* is computed as the actual fraction of the aggregate compensation of the top five executives, including the CEO (Bebchuk et al., 2011); *Tobin's Q* is computed as the market value of equity plus the book value of assets minus the book value of equity, all divided by the book value of assets; *Tobin's Q_Dummy* equals one if *Tobin's Q* is higher than the median value of the full sample, and zero otherwise; *SIZE* is the natural logarithm of total assets; *LEV* is the ratio of long-term debt to total assets; *GOV* is the governance index from the MSCI-ESG database; and *DIV* is the dividend ratio, computed as dividends paid divided by total assets; and All financial variables are winsorized at the first and 99th percentiles. Robust and bootstrap standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	(1) EP	(2) EP
CPS_Actual	0.587*** (0.189)	0.140 (0.197)
Tobin's Q_Dummy		0.267*** (0.054)
CPS_Actual*Tobin's Q_Dummy		0.896*** (0.129)
SIZE	0.348*** (0.017)	0.365*** (0.017)
LEV	-0.416*** (0.145)	-0.373*** (0.144)
GOV	-0.005 (0.010)	-0.009 (0.010)
DIV	2.871*** (0.864)	0.497 (0.885)
Constant	0.130 (0.369)	-0.205 (0.383)
<i>Observations</i>	6,930	6,930
<i>R-Squared</i>	0.140	0.155
<i>Year fixed effects</i>	Yes	Yes
<i>Industry fixed effects</i>	Yes	Yes

Table 8. Alternative measure of EP from Sustainalytics

This table presents the results of regressions on the effect of the CPS on EP. The variable *EP_Sustain* refers to the environmental score from the Sustainalytics database; *CPS* is the CEO power measure, computed as the fraction of the aggregate compensation of the top five executives, including the CEO (Bebchuk et al., 2011); *Tobin's Q* is computed as the market value of equity plus the book value of assets minus the book value of equity, all divided by the book value of assets; *Tobin's Q_dummy* equals one if *Tobin's Q* is higher than the median value of the full sample, and zero otherwise; *SIZE* is the natural logarithm of total assets; *LEV* is the ratio of long-term debt to total assets; *GOV_Sustain* is the governance score from the Sustainalytics database; and *DIV* is the dividend ratio, computed as dividends paid divided by total assets. All financial variables are winsorized at the first and 99th percentiles. Robust standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	(1) EP_Sustain	(2) EP_Sustain
CPS_(t-1)	5.092*** (1.486)	0.846 (2.193)
Tobin's Q_Dummy		-0.544 (1.230)
CPS_(t-1)*Tobin's Q_Dummy		4.903** (2.870)
SIZE	5.096*** (0.227)	4.661*** (0.189)
LEV	-2.477* (1.505)	-5.883*** (1.245)
GOV_Sustain	0.407*** (0.029)	0.415*** (0.028)
DIV	40.924*** (8.946)	56.287*** (8.681)
Constant	-38.488*** (3.305)	-21.197*** (2.538)
<i>Observations</i>	2,924	2,924
<i>R-Squared</i>	0.609	0.471
<i>Year fixed effects</i>	Yes	Yes
<i>Industry fixed effects</i>	Yes	Yes

Table 9. Splitting the sample

Table 9 presents the estimation results of the effect of the CPS on EP for two subsamples of firms, with high and low performance, respectively. We assign firms to the high-performance groups if the value of *Tobin's Q* is above the median of the full sample; the Low performance subsample includes those firms where *Tobin's Q* is below the median. The variable *EP* refers to the environmental pillar score from the MSCI-ESG database; *CPS* is the CEO power measure, computed as the fraction of the aggregate compensation of the top five executives, including the CEO (Bebchuk et al., 2011); *SIZE* is the natural logarithm of total assets; *LEV* is the ratio of long-term debt to total assets; *GOV* is the governance index from the MSCI-ESG database, and *DIV* is the dividend ratio, computed as dividends paid divided by total assets. Robust standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	EP Low performance	EP High performance
CPS_(t-1)	0.156 (0.231)	0.748*** (0.213)
SIZE	0.414*** (0.030)	0.536*** (0.025)
LEV	0.144 (0.271)	-0.653*** (0.155)
GOV	0.049* (0.012)	0.030 (0.011)
DIV	10.655*** (2.205)	4.118*** (1.036)
Constant	0.557* (0.316)	-0.993** (0.400)
<i>Observations</i>		
	2,446	2,779
<i>R-Squared</i>		
	0.397	0.483
<i>Year fixed effects</i>		
	Yes	Yes
<i>Industry fixed effects</i>		
	Yes	Yes
<i>Chow_Test</i>		
	<i>Prob > $\chi^2 = 0.0030$</i>	

Table 10. Testing excessive CEO power

This table displays the OLS estimation results for the relation between CEO power and EP in the presence of CEO duality. The variable *CEO Duality* is a dummy variable that equals one if the CEO is also the chairperson of the board, and zero otherwise; *EP* refers to the environmental pillar score from the MSCI-ESG database; *CPS* is the CEO power measure, computed as the fraction of the aggregate compensation of the top five executives, including the CEO (Bebchuk et al., 2011); *Tobin's Q* is computed as the market value of equity plus the book value of assets minus the book value of equity, all divided by the book value of assets; *ROA* is the return on assets, defined as net income divided by the book value of assets; *SIZE* is the natural logarithm of total assets; *LEV* is the ratio of long-term debt to total assets; *GOV* is the governance index from the MSCI-ESG database; and *DIV* is the dividend ratio, computed as dividends paid divided by total assets. All financial variables are winsorized at the first and 99th percentiles. Robust standard errors clustered at the firm level are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	CEO Duality = 1	CEO Duality = 0
CPS_(t-1)	-0.470 (0.350)	0.789** (0.323)
ROA	-0.644 (0.523)	1.628*** (0.413)
SIZE	0.524*** (0.033)	0.314*** (0.033)
LEV	-1.011*** (0.247)	-0.562** (0.276)
GOV	0.021 (0.018)	0.033* (0.018)
DIV	5.110*** (1.751)	3.734** (1.446)
Constant	-0.412 (0.587)	2.343*** (0.644)
<i>Observations</i>	2,039	1,928
<i>R-Squared</i>	0.397	0.378
<i>Year fixed effects</i>	YES	YES
<i>Industry fixed effects</i>	YES	YES

Table 11. Heckman sample selection bias test

This table displays the estimation results for the relation between CEO power and EP. The variable *EP* refers to the environmental pillar score from the MSCI-ESG database; *CPS* is the CEO power measure, computed as the fraction of the aggregate compensation of the top five executives, including the CEO (Bebchuk et al., 2011); *Tobin's Q* is computed as the market value of equity plus the book value of assets minus the book value of equity, all divided by the book value of assets; *SIZE* is the natural logarithm of total assets; *LEV* is the ratio of long-term debt to total assets; *GOV* is the governance index from the MSCI-ESG database; and *DIV* is the dividend ratio, computed as dividends paid divided by total assets. and All financial variables are winsorized at the first and 99th percentiles. Robust standard errors clustered at the firm level are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	EP
CPS _(t-1)	0.514** (0.217)
Tobin's Q	0.042*** (0.006)
SIZE	0.318*** (0.030)
LEV	-0.066 (0.233)
GOV	0.093** (0.047)
DIV	0.795 (1.060)
LAMBDA	2.133** (0.911)
Constant	-0.931 (1.407)
<i>Observations</i>	<i>13,813</i>
<i>Year fixed effects</i>	<i>Yes</i>
<i>Industry fixed effects</i>	<i>Yes</i>

[†] See the 2013 U.S. CEO Survey: Creating Value in Uncertain Times, at <https://www.pwc.com/gx/en/ceo-survey/2013/pdf/us-ceo-survey-2013.pdf>.